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NOTICE OF ALLOWANCE AND FEE(S) DUE

30593

7590

10/10/2008

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. BOX 8910
RESTON, VA 20195

EXAMINER

THANGAVELU, KANDASAMY

ART UNIT

PAPER NUMBER

2123

DATE MAILED: 10/10/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,302	06/02/2005	Noriyuki Suzuki	2691-000019/US	1709

TITLE OF INVENTION: SIMULATION METHOD AND APPARATUS FOR SIMULATING IMAGE OF TWISTED YARN

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	01/12/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE** OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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30593 7590 10/10/2008
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RESTON, VA 20195

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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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nonprovisional	NO	\$1510	\$300	\$0	\$1810	01/12/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
THANGAVELU, KANDASAMY	2123	703-006000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB-112) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB-47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____
Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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RESTON, VA 20195

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 800 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 800 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability

Application No.

10/537,302

Examiner

KANDASAMY THANGAVELU

Applicant(s)

SUZUKI, NORIYUKI

Art Unit

2123

- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to June 2, 2005.
2. ☒ The allowed claim(s) is/are 1-10, 12-14 and 16.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date 6/2/05, 9/8/05 and 12/29/05
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date ____.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☒ Other Clean Copy of Allowed Claims.

DETAILED ACTION

Introduction

1. This communication is in response to the Applicants' communication dated June 2, 2005. Claims 11 and 12 were amended. Claims 15 and 16 were added. Claims 1-16 of the application are pending.

Foreign Priority

2. Acknowledgment is made of applicant's claim for foreign priority based on a PCT application PCT/JP2003/015373 filed in Japan on 2 December 2003 and a Japanese application P2002/351826 filed in Japan on 2 December 2002. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

3. Acknowledgment is made of the information disclosure statements filed on June 2, 2005, September 8, 2005 and December 29, 2005 together with copies of the patents and papers. The patents and papers have been considered.

Examiner's Amendment

4. Authorization for this examiner's amendment was given in a telephone conversation by Mr. Donald Daley on August 21, 2008.

An Examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to the applicants, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

5. In claim 1, Line 1, "A method for simulating"
has been changed to
-- A computer implemented method for simulating --.

In claim 2, Lines 13-14, "the cross-section shapes arranged in the cross-section shapes arranged in the cross-section"
has been changed to
-- the cross-section shapes arranged in the cross-section --.

In claim 4, Line 5, "diameters of the abstracted models of the yarns"
has been changed to
-- diameters of the yarns in the abstracted models of the yarns --.

In claim 5, Line 3, "square root of an abstracted model of one yarn"

has been changed to

-- square root of diameter of yarn in an abstracted model of one yarn --.

Cancel claim 11.

Cancel claim 15.

A clean copy of allowed claims is attached.

Reasons for Allowance

6. Claims 1-10, 12-14 and 16 of the application are allowed over prior art of record.

7. The following is an Examiner's statement of reasons for the indication of allowable subject matter:

The closest prior art of record shows:

(1) geometry of two-components yarns taking into account the compression deformation of the individual strands caused by transverse forces generated during the twisting process; the change in the cross-section takes into account the mechanical properties of the strands and the observed changes in cross-section shape caused by lateral forces; a mathematical model calculates the cross-sectional dimensions of the strands and the shape of the yarns; the model assumes that the initial strand cross section is circular, the bending curve is approximated by a

linear law between the bending moment and the curvature of the center line of the strand, the compression curve can be measured in independent experiments by compressing the strand between two plates, the compression of strands caused by twisting is preserved during the relaxation process of the yarn and that when the two strands are compressed together, they are flattened and an area of contact is established between them; the compressive force and strand dimensions are computed using the model which includes computation of behavior of strand cross section under compression (**Grishanov et al.**, "The simulation of the geometry of two-component yarns Part I: the mechanics of strand compression: Simulating yarn cross-section shape", Journal of Textile Institute);

(2) heather yarn imparts unique appearance properties to a fabric made using the same; the appearance characteristics of the heather yarn may be varied by adjusting selected yarn manufacturing parameters; a computer aided apparatus and method to generate and display an accurate predictive simulation of the appearance of a color pattern of a hypothetical heather yarn fabric such as a tufted carpet, comprised of multiple candidate heather yarn components; based on a set of user specified initial conditions, a model is generated representing the appearance of a hypothetical heather yarn, which appearance would be imparted to a hypothetical fabric made from that yarn; parameters incorporated in the model relate the appearance properties to actual yarn manufacturing process conditions; the resulting simulated color coordinates are transformed into a typical nonlinear color space of the display device to permit colors to be accurately displayed to be properly perceptible to a viewer (**Jansson**, U.S. Patent 5,680,333); and

(3) a system for modeling yarns, that uses data from yarn measurement systems; the yarn modeling system incorporates parameters of yarn production parameters; identifying points on

the surface of the yarn and calculating position and orientation vectors for the points; creating a three dimensional map of the surface of the yarn; the yarn modeling system identifies yarns that are suitable for certain types of fabrics; a fabric modeling system that models and displays a representation of the fabric based on a yarn model; the fabric modeling system models fabric including various types of yarns, various types of weaves, knits and other types of fabric; a system for visually representing yarns and fabrics based on yarn parameters and user defined fabric parameters; (**Hardt et al.**, PCT/EP97/05623).

None of these references taken either alone or in combination with the prior art of record discloses a computer implemented method for simulating an image of a twisted yarn, specifically including:

(Claim 1) “an abstracting step of producing, based on the images that have been input in the image input step, an abstracted model of each of the yarns that extends in one direction and has a certain cross-section of a predetermined mathematizable shape to abstract each of the yarns, and of setting correspondence between each of the abstracted models and the images;

a twisting step of twisting, according to a predetermined condition, the abstracted models of the plurality of yarns that have been abstracted in the abstracting step and of producing an abstracted model of a twisted yarn in a form extending along a central axis thereof;

a projection step of projecting the abstracted model of the twisted yarn that has been produced in the twisting step onto a plane that is in parallel with the central axis; and

an image reproduction step of reproducing, based on the correspondence that has been set in the abstracting step, the images of the yarns on corresponding projected images of the

abstracted models of the yarns included in the abstracted model of the twisted yarn that has been projected onto the plane in the projection step” in combination with the remaining elements and features of the claimed invention.

None of these references taken either alone or in combination with the prior art of record discloses a computer-readable storage medium storing a program read by a computer to execute the method for simulating an image of a twisted yarn, specifically including:

(Claim 12) “an abstracting step of producing, based on the images that have been input in the image input step, an abstracted model of each of the yarns that extends in one direction and has a certain cross-section of a predetermined mathematizable shape to abstract each of the yarns, and of setting correspondence between each of the abstracted models and the images;

a twisting step of twisting, according to a predetermined condition, the abstracted models of the plurality of yarns that have been abstracted in the abstracting step and of producing an abstracted model of a twisted yarn in a form extending along a central axis thereof;

a projection step of projecting the abstracted model of the twisted yarn that has been produced in the twisting step onto a plane that is in parallel with the central axis; and

an image reproduction step of reproducing, based on the correspondence that has been set in the abstracting step, the images of the yarns on corresponding projected images of the abstracted models of the yarns included in the abstracted model of the twisted yarn that has been projected onto the plane in the projection step” in combination with the remaining elements and features of the claimed invention.

None of these references taken either alone or in combination with the prior art of record discloses an apparatus for simulating an image of a twisted yarn, specifically including:

(Claim 13) “abstracting means for producing, based on the images that have been input in the image input means, an abstracted model of each of the yarns that extends in one direction and has a certain cross-section of a predetermined mathematizable shape to abstract each of the yarns, and for setting correspondence between each of the abstracted models and the images;

twisting means for twisting, according to a predetermined condition, the abstracted models of the plurality of yarns that have been abstracted in the abstracting means and of producing an abstracted model of a twisted yarn in a form extending along a central axis thereof;

projection means for projecting the abstracted model of the twisted yarn that has been produced in the twisting means onto a plane that is in parallel with the central axis; and

image reproduction means for displaying a state in which the images of the yarns are reproduced, based on the correspondence that has been set by the abstracting means, on corresponding projected images of the abstracted models of the yarns included in the abstracted model of the twisted yarn that has been projected onto the plane by the projection means” in combination with the remaining elements and features of the claimed invention.

None of these references taken either alone or in combination with the prior art of record discloses a computer-readable storage medium storing a program read by a computer to execute the method for simulating an image of a twisted yarn, specifically including:

(Claim 16) “an abstracting step of producing, based on the images that have been input in the image input step, an abstracted model of each of the yarns that extends in one direction

and has a certain cross-section of a predetermined mathematizable shape to abstract each of the yarns, and of setting correspondence between each of the abstracted models and the images;

a twisting step of twisting, according to a predetermined condition, the abstracted models of the plurality of yarns that have been abstracted in the abstracting step and of producing an abstracted model of a twisted yarn in a form extending along a central axis thereof;

a projection step of projecting the abstracted model of the twisted yarn that has been produced in the twisting step onto a plane that is in parallel with the central axis; and

an image reproduction step of reproducing, based on the correspondence that has been set in the abstracting step, the images of the yarns on corresponding projected images of the abstracted models of the yarns included in the abstracted model of the twisted yarn that has been projected onto the plane in the projection step” in combination with the remaining elements and features of the claimed invention.

8. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is 571-272-3717. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez, can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to TC 2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Kandasamy Thangavelu/
Examiner, Art Unit 2123
August 22, 2008